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10/652,800	08/28/2003	Tadashi Tsunoda	TOW-039	2015

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LAHIVE & COCKFIELD, LLP.
28 STATE STREET
BOSTON, MA 02109

EXAMINER

ALEJANDRO, RAYMOND

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 02/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/652,800

Applicant(s)

TSUNODA, TADASHI

Examiner

Raymond Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 August 2003.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-8 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 28 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 08/28/03, 03/17/05.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statements (IDS) submitted on 08/28/03 and 03/17/05 were considered by the examiner.

Drawings

3. The drawings were received on 08/28/03. These drawings are acceptable.

Specification

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Double Patenting

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground

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provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1, 5 and 7-8 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5 of copending Application No. 10/652748 (*US Patent Application Publication 2004/0043270*). Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

The copending application'748 claims the following (CLAIMS 1-5):

1. A fuel cell comprising a pair of separators and electrolyte electrode assemblies interposed between said separators, said electrolyte electrode assemblies each including an anode, a cathode, and an electrolyte interposed between said anode and said cathode, wherein

each of said separators includes a first plate and a second plate stacked together;

a fuel gas channel for supplying a fuel gas to said anode, and an oxygen-containing gas channel for supplying an oxygen-containing gas to said cathode are formed between said first and second plates;

a first ridge is formed on said first plate, and a second ridge is formed on said second plate, and said first ridge and said second ridge protrude away from each other to form said oxygen-containing gas channel between said first ridge and said second ridge;

said first plate includes a first outer projection and a first inner projection on opposite sides of said first ridge;

said second plate includes a second outer projection and a second inner projection on opposite sides of said second ridge; and

said first outer projection and said first inner projection protrude oppositely to said first ridge, and said second inner projection and said second outer projection protrude oppositely to said second ridge such that said first outer projection and said second outer projection are in contact with each other, and said first inner projection and said second inner projection are in contact with each other.

2. A fuel cell according to claim 1, wherein

said first ridge is formed integrally with said first plate, and extends around a curved outer section of said first plate;

said second ridge is formed integrally with said second plate, and extends around a curved outer section of said second plate;

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said first outer projection and said first inner projection are formed integrally with said first plate; and

said second outer projection and said second inner projection are formed integrally with said second plate.

3. A fuel cell according to claim 2, wherein said first ridge formed on said first plate of one of said separators is in contact with said second ridge formed on said second plate of the other of said separators to form an exhaust gas channel having an end closed between said separators.

4. A fuel cell according to claim 1, wherein a seal for sealing said oxygen-containing gas channel is formed between said first ridge formed on said first plate of one of said separators and said second ridge formed on said second plate of the other of said separators.

5. A fuel cell according to claim 1, wherein said electrolyte electrode assemblies are arranged along at least one circle concentric with a central axis of said separators.

* * * * *

In this instance, the claims of the copending application '748 fully encompasses the subject matter claimed in the present application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

7. Claims 1-8 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9, 13-15 and 18-19 of copending Application No. 10/608592 (*US Patent Application Publication 2004/0028986*).

Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

The copending application '592 claims the following (CLAIMS 1-9, 13-15 and 18-19):

1. A fuel cell comprising a pair of separators and electrolyte electrode assemblies interposed between said separators, said electrolyte electrode assemblies each including an anode, and a cathode, and an electrolyte interposed between said anode and said cathode, wherein

each of said separators includes at least two plates stacked together;

a fuel gas channel for supplying a fuel gas to said anode, and an oxygen-containing gas channel for supplying an oxygen-containing gas to said cathode are formed between said plates; and

said electrolyte electrode assemblies are arranged along at least one virtual circle concentric with a central axis of said separators.

2. A fuel cell according to claim 1, wherein said electrolyte electrode assemblies are arranged along at least two virtual circles concentric with a central axis of said separators.

3. A fuel cell according to claim 2, wherein said virtual circles include an inner circle and an outer circle, and electrolyte electrode assemblies arranged on said inner circle are out of radial alignment with electrolyte electrode assemblies arranged on said outer circle.

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4. A fuel cell according to claim 2, wherein said virtual circles include an inner circle and an outer circle, and said electrolyte electrode assemblies are arranged along said inner circle and said outer circle alternately.

5. A fuel cell according to claim 1, wherein said fuel gas and said oxygen-containing gas are supplied through said fuel gas channel and said oxygen-containing gas channel to central regions on opposite surfaces of said electrolyte electrode assemblies, respectively.

6. A fuel cell according to claim 1, wherein said fuel gas channel and said oxygen-containing gas channel are provided between two of said plates.

7. A fuel cell according to claim 6, wherein said discharge passage for discharging said fuel gas and said oxygen-containing gas after reaction is provided between said separators.

8. A fuel cell according to claim 1, wherein a circular hole extends through said separators centrally;

said electrolyte electrode assemblies have a circular disk shape; and

said electrolyte electrode assemblies are arranged around said circular hole, along at least one virtual circle concentric with said circular hole.

9. A fuel cell according to claim 8, wherein said electrolyte electrode assemblies are arranged around said circular hole, along at least two virtual circle concentric with said circular hole.

13. A fuel cell comprising a pair of separators and electrolyte electrode assemblies interposed between said separators, said electrolyte electrode assemblies each including an anode, and a cathode, and an electrolyte interposed between said anode and cathode, wherein

each of said separators includes a plurality of plates stacked together;

a fuel gas channel for supplying a fuel gas to said anode, and an oxygen-containing gas channel for supplying an oxygen-containing gas to said cathode are formed between said plates; and

at least one of said plates has protrusions for positioning said electrolyte electrode assemblies between said separators.

14. A fuel cell according to claim 13, wherein said protrusions are provided so that said electrolyte electrode assemblies are arranged along at least one virtual circle concentric with a central axis of said separators.

15. A fuel cell according to claim 14, wherein said virtual circles include an inner circle and an outer circle, and electrolyte electrode assemblies arranged on said inner circle are out of radial alignment with electrolyte electrode assemblies arranged on said outer circle.

18. A fuel cell stack formed by stacking a plurality of fuel cells and providing flanges at opposite ends in a stacking direction of said fuel cells, said fuel cells each including disk-shaped separators and a plurality of circular disk-shaped electrolyte electrode assemblies interposed between said separators, said electrolyte electrode assemblies each including an anode, a cathode, and an electrolyte, wherein

each of said separators has protrusions for positioning said electrolyte electrode assemblies between said separators;

said electrolyte electrode assemblies are arranged along at least one circle concentric with a central axis of said separators; and

each of said flanges has holes for inserting bolts to tighten said fuel cell stack, and said holes and said electrolyte electrode assemblies are arranged alternately.

19. A fuel cell stack according to claim 18, wherein said protrusions are provided so that said electrolyte electrode assemblies are arranged along at least one virtual circle concentric with a central axis of said separators.

In this instance, the claims of the copending application '592 also fully encompasses the subject matter claimed in the present application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

8. Claims 1-2, 5 and 7 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-7 of copending Application No. 10/608581 (*US Patent Application Publication 2004/0053107*). Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

The copending application '581 claims the following (CLAIMS 1-7):

1. A fuel cell comprising a pair of separators and electrolyte electrode assemblies interposed between said separators, said electrolyte electrode assemblies each including an anode, a cathode, and an electrolyte interposed between said anode and said cathode, wherein

a first area for providing said electrolyte electrode assemblies is formed between said separators;

each of said separators includes a first plate and a second plate stacked together to form a second area between said first plate and said second plate;

said second area is divided by a partition into a fuel gas channel, and oxygen-containing gas channel;

said fuel gas channel formed in one of said separators is connected to said first area through fuel gas inlets for supplying said fuel gas to anodes of said electrolyte electrode assemblies; and

said oxygen-containing gas channel formed in the other of said separators is connected to said first area through oxygen-containing gas inlets for supplying said oxygen-containing gas to cathodes of said electrolyte electrode assemblies.

2. A fuel cell stack according to claim 1, wherein said partition includes a ridge protruding from said first plate to contact said second plate.

3. A fuel cell stack according to claim 1, wherein said partition includes a ridge protruding from said second plate to contact said first plate.

4. A fuel cell according to claim 1, said fuel gas and said oxygen-containing gas are supplied through said fuel gas inlets and said oxygen-containing gas inlets to central regions on opposite surfaces of said electrolyte electrode assemblies, respectively.

5. A fuel cell according to claim 1, wherein said first bosses and said second bosses protrude toward each other for sandwiching said electrolyte electrode assemblies.

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6. A fuel cell according to claim 5, wherein said first bosses and said second bosses are current collectors for collecting electric energy produced by chemical reaction of said fuel gas and said oxygen-containing gas supplied to opposite surfaces of electrolyte electrode assemblies.

7. A fuel cell according to claim 5, wherein said first bosses protrude toward said electrolyte electrode assemblies by a large distance in comparison with said second bosses.

In this instance, again, the claims of the copending application '581 fully encompasses the subject matter claimed in the present application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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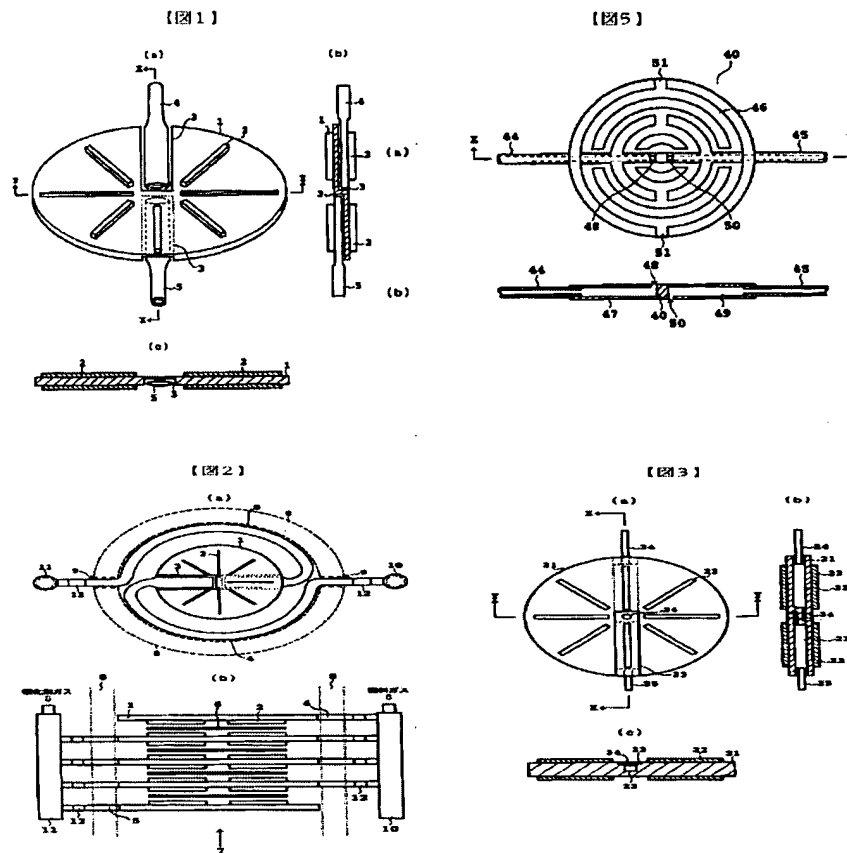
11. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese publication JP 11-16581 (herein called "*the JP'581 publication*") in view of view of the Japanese publication JP 2000-311698 (herein called "*the JP'698*").

The present application is directed to a fuel cell wherein the disclosed inventive concept comprises the specific separator configuration.

Concerning claim 1:

The JP'581 publication disclose a solid oxide fuel cell (ABSTRACT) a straight groove 3 formed from one end edge of one main face in each separator 1 of a layered structure body to its center; and another straight groove 3 extended from one end edge different from the foregoing end edge of the main face to the center being formed in the other main face of the separator 1 (ABSTRACT). A fuel gas supplying pipe is inserted at least into the groove 3 in one main face; and an oxidizing gas supplying pipe 5 is inserted at least partially into the groove 3 of the other main face, respectively. Plural rib members 2 projected from a surface and formed radially are provided on both main face of each separator (ABSTRACT). It is disclosed that an anode, a cathode and an electrolyte are arranged therein (ABSTRACT).

Figures 1-3 and 5 below illustrate the fuel cell configuration comprising at least the separating structure formed by a layered body and which further includes first and second elements through which fuel and oxidant are introduced:

As for claim 2:

As evident from Figure 1 above, right at the center of the circular assembly there is provided a division such that a reactant are introduced from one side as well as through the opposite side (See FIGURE 1).

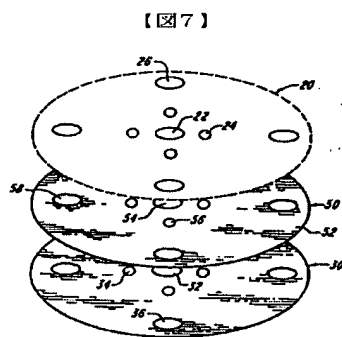
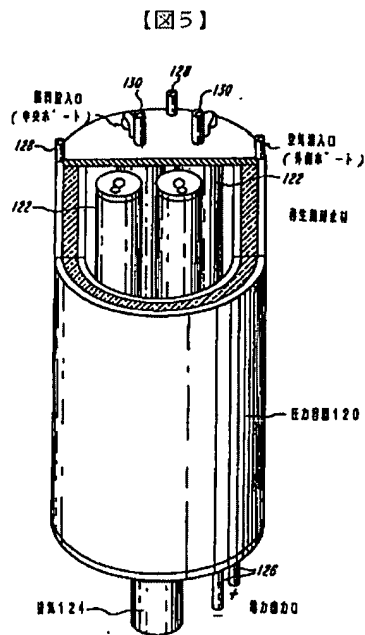
The JP'581 publication disclose a fuel cell arrangement as seen and described above. Nevertheless, the JP'581 publication fails to expressly disclose the specific fuel gas supply hole-discharge passage.

As to claims 1-4:

The JP'698 teaches an electrochemical converter adapted to receive first and second mediums and to allow an electrochemical reaction between the first and second medium

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(ABSTRACT). **Figures 5 and 7** of the JP'698 teaches illustrate the concentrically located electrochemical converters (Figure 5) and a circular hole (Figure 7) regardless of its ultimate intended use:



In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to employ the specific fuel gas supply hole-discharge passage, as a whole, of JP'698 in the fuel cell assembly of the JP'581 publication as JP'698 discloses that such specific arrangement and circular hole allows to provide a high performance power system capable of integrating and employing the desirable properties of electrochemical converters. Accordingly,

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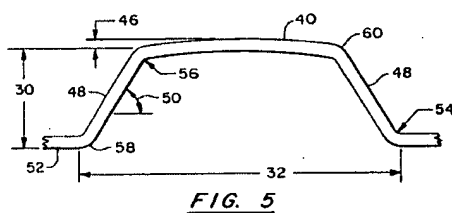
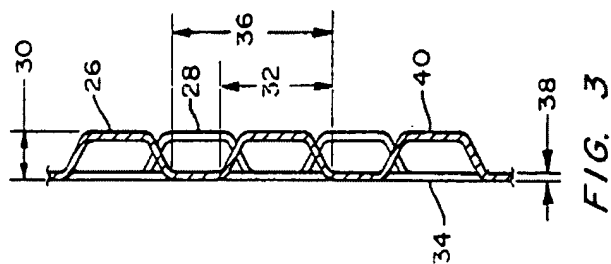
such arrangement reduces the costs associated with providing dedicated thermal processing systems while significantly increasing the overall system power efficiency. Thus, such arrangement minimizes the requirement of conventionally-required thermal processing systems, hence, temperature distribution is enhanced along, through and across the arrangement.

Moreover, it has been held that re-arrangement, reversal or duplication of parts is obvious. Succinctly stated, fact that a claimed feature is structurally re-arranged, reversed or duplicated is not sufficient by itself to patentably distinguish over an otherwise old feature unless there are new or unexpected results as it is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed electrolyte-electrode assembly and circular hole were significant. In re Japikse 86 USPQ 70. In re Kuhle 188 USPQ 7. In re Gazda 104 USPQ 400. In re Harza 124 USPQ 378. (Refer to MPEP 2144.04 [R-1] Legal Precedent as Source of Supporting Rationale: VI. Reversal, Duplication, OR Rearrangement of Parts).

12. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese publication JP 11-16581 (herein called “*the JP’581 publication*”) in view of view of the Japanese publication JP 2000-311698 (herein called “*the JP’698*”) as applied to claim 1 above, and further in view of Katz et al 4983472.

The JP’581 and the JP’698 are applied, argued and incorporated herein for the reasons above. However, the preceding reference does not expressly disclose the specific protrusion configuration.

Katz et al makes known a fuel cell having a current collector plate 22 wherein the current collector has a plurality of arches 26, 28 deformed from a single flat plate in a checkerboard pattern and wherein the arches are of sufficient height to provide sufficient reactant flow area (ABSTRACT). **Figures 3 and 5** below depict the specific configuration of the current collector including a boss-like pattern:



In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to employ the specific bosses-current collector configuration of Katz et al in the fuel cell assembly of the JP'581 and the JP'698 as Katz et al divulges that such specific bosses-current collector configuration is formed with sufficient stiffness to accept compressive load and sufficient resiliently to distribute the load and maintain electrical contact. In addition to that, it is of sufficient height to provide sufficient reactant flow area.

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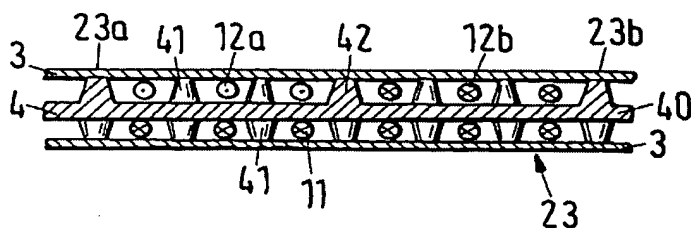
13. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese publication JP 11-16581 (herein called "*the JP'581 publication*") in view of view of the Japanese publication JP 2000-311698 (herein called "*the JP'698*"), and further in view of Katz et al 4983472 as applied to claim 5 above, and further in view of the European publication 1075033 (hereinafter referred to as "*the EP'033 publication*").

The JP'581, the JP'698 and Katz et al are applied, argued and incorporated herein for the reasons above. However, the preceding reference does not expressly disclose the specific ridge configuration.

The EP'033 publication reveals a planar fuel cell battery stack (ABSTRACT) including interconnector plates 4 with intermediate straight or curved zones 20 and profiled to divert two fluids 11, 12 separately through the cell (ABSTRACT).

Figure 2 below illustrates the ridge-partition configuration:

Fig. 2



In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the specific ridge-partition configuration of the EP'033 publication in the fuel cell assembly of the JP'581, the JP'698 and Katz et al as the EP'033 publication teaches that such specific ridge-partition configuration are profiled and designed for allowing flow of two fluids separately. Thus, it assists in providing a reliable two fluid distribution structure for electrochemical cell purposes.

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14. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese publication JP 11-16581 (herein called "*the JP'581 publication*") in view of view of the Japanese publication JP 2000-311698 (herein called "*the JP'698*") as applied to claim 1 above, and further in view of Wilson et al 5595834.

The JP'581 and the JP'698 are applied, argued and incorporated herein for the reasons above. However, the preceding reference does not expressly disclose the specific concentric arrangement of electrolyte-electrode assemblies.

Wilson et al disclose a stack of polymer electrolyte fuel cells formed from a plurality of unit cells where each unit cell includes fuel cell components defining a periphery and distributed along a common axis (ABSTRACT).

Examiner's note: *per Merriam-Webster's Collegiate Dictionary, 10th Edition, the term "concentric" is also defined as having a common axis. Thus, the teachings of Wilson et al suggest to arrange a plurality of unit cells along a common axis.*

In view of these teachings, it would have been obvious to one skill in the art at the time the invention was made to employ the specific concentric arrangement of electrolyte-electrode assemblies of Wilson et al in the fuel cell of the JP'581 and the JP'698 because Wilson et al teach that such an arrangement allows to obtain a satisfactory stack configuration that is relatively independent of stack orientation which permits better distribution of reactants, minimize water loss and drying of the cell; and minimize cell over-heating. It also provides a fuel cell arrangement with a simple geometry and of minimum size and weight.

In addition to that, it has been held that re-arrangement, reversal or duplication of parts is obvious. Succinctly stated, fact that the claimed electrolyte-electrode assemblies are structurally

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re-arranged, reversed or duplicated is not sufficient by itself to patentably distinguish over an otherwise old feature unless there are new or unexpected results as it is a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular configuration of the claimed electrolyte-electrode assemblies was significant. In re Japikse 86 USPQ 70. In re Kuhle 188 USPQ 7. In re Gazda 104 USPQ 400. In re Harza 124 USPQ 378. (***Refer to MPEP 2144.04 [R-1] Legal Precedent as Source of Supporting Rationale: VI. Reversal, Duplication, OR Rearrangement of Parts***). In this instance, Wilson et al has also been cited herein to provide substantive evidence that the prior art contemplates arrangement or re-arrangement of fuel cell units as instantly claimed.

Conclusion

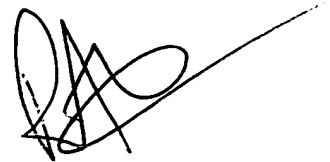
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro
Primary Examiner
Art Unit 1745

A handwritten signature in black ink, appearing to be 'RA', with a long horizontal stroke extending to the right.

**RAYMOND ALEJANDRO
PRIMARY EXAMINER**